



Here's a brief look at the three space station options that NASA proposed to the White House. Story on Page 3.



A JSC team brings home the NASA Flight Safety Award for the first time. Story on Page 4.

# Space News Roundup

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## Clinton OKs budget-minded space station

President plans to redesign space agency, reduce personnel as well

President Bill Clinton has recommended a scaled-down space station that will significantly reduce costs to taxpayers, preserve critical research, ensure international cooperation and mean a major redesign of NASA as well.

The redesign will likely resemble two of three options NASA returned to the President after he directed the agency to conduct a 90-day review of the Space Station *Freedom* Program, the White House said.

The redesigned station is expected to save an estimated \$18 billion over the projected two-decade life of the program, with more than \$4 billion in savings in the next five years due to decreased development, operations and management costs, the White House said.

"At a time when our long-term economic strength depends on our technological leadership and our ability to reduce the deficit, we must invest in technology but invest wisely," Clinton said.

"I instructed NASA to redesign the space station program in a way that would preserve its critical science and space research and ensure international cooperation but significantly reduce costs and improve management. NASA has met that challenge."

Clinton said his administration would work with Congress, NASA and America's international partners

during the next 90 days to make the best use of the simplified design, based primarily on Option A but with elements of Option B, which was the most like the Space Station *Freedom* design.

A package giving a brief overview of all three options, as presented to the White House Advisory Panel led by Dr. Charles Vest, is on Page 3 of this week's Space News Roundup.

"I am calling for the U.S. to work with our international partners to

develop a reduced cost, scaled-down version of the original Space Station *Freedom*. At the same time, I will also seek to enhance and expand the opportunities for international participation in the space station project so that the space station can serve as a model of nations coming together in peaceful cooperation," Clinton said.

"Finally, I will be directing NASA to implement personnel reductions Please see **GOLDIN**, Page 4

## Clinton shares strong support with shuttle crew

With crucial Congressional votes on the future of NASA's proposed space station expected this week, President Bill Clinton voiced strong support for America's space program during a Tuesday telephone conversation with the STS-57 crew.

"We are very proud of you and we are very proud of the NASA folks down here who are supporting you," Clinton said. "I want to encourage you and say again that I am behind you, this administration is behind you and I think the American people are behind you."

The President said he expected the *Endeavour* crew's hard work to be a great help in carrying Tuesday's planned vote by the full House on appropriations that include NASA and space station funding.

"While you are up there, we're going to be down here trying to support the space program and the space station," Clinton said. "I think frankly your success and your work will help us to prevail. You are doing as much up there to help us win the votes down here as anyone and I thank you for that."

"We certainly all consider it to be an immensely important project in continuing our leadership in science and technology," Commander Ron Grabe responded.

Clinton also said he believes the international work on this mission and on the space station play an important role in America's leadership of the world toward cooperation in the area of technology development. He said he was especially pleased with the cooperation exhibited by NASA and the European Space Agency in deploying the European Retrievable Carrier satellite last July and retrieving it Thursday.

"The American people in watching you today can see one area of human endeavor in which we are indisputably continuing to lead the world and bringing other countries



The STS-57 crew takes a phone call from President Bill Clinton on the aft flight deck of *Endeavour*. From left are Pilot Brian Duffy, Mission Specialists Jeff Wisoff and Nancy Sherlock, Commander Ron Grabe, and Mission Specialists Janice Voss and David Low.

into partnership, both leadership and technology and science partnership with other countries," Clinton said. "Those are the keys to our future as a people to our standard of living, to our quality of life as well as to our ability to continue the American tradition of exploring frontiers."

"We have been working very hard for about a year training for this rendezvous and retrieval and we got a lot of fantastic support both in our own country and on our ground control support team and the international team all over in Europe and we are looking forward to bring back great science on EURECA for the Europeans," said Mission Specialist Nancy Sherlock.

The President said he also appreciated the international education outreach efforts of the Shuttle Amateur Radio Experiment contacts being made by Pilot Brian Duffy

and Mission Specialist Janice Voss, in part because his daughter is a big fan of the space program.

"We find that using amateur radio is an excellent way of communicating with children all around the world and we are also able to excite them by using space and science and letting them see space and science in action," Duffy said. "We are able to excite them and hope they will study harder."

"You may be on this mission creating thousands of scientists for the future just by the power of your example and by this direct communication," Clinton agreed, "and I think sometimes we underestimate the impact that human contact in an enormously impressive setting like this can have on children all across the world, not only those with whom you'll talk but millions of others who will just see it and know that it happened."

## International team snares spacecraft

The STS-57 team, working in close cooperation with European flight controllers, successfully snared the European Retrievable Carrier at 8:55 a.m. CDT Thursday, achieving one of the prime objectives of the mission.

"Houston, *Endeavour*—we've captured," reported Commander Ron Grabe once Payload Commander G. David Low grappled the satellite, which had been in orbit for the past 10 months to study material and life sciences and radiobiology.

"*Endeavour*—EURECA!" replied Capcom Jay Apt. "There's a lot of smiling faces down here and you can probably hear everybody clapping. Nice work."

Plans to tuck EURECA safely into the payload bay were delayed because European Space Agency controllers in Darmstadt, Germany, were not immediately able to command the satellite's two communications antennas to fully fold and latch against the satellite. The two antennas were within a few degrees of being completely stowed, and the ESA controllers had successfully commanded the satellite's solar panels to retract.

Controllers at JSC and in Germany were using television pictures to carefully inspect the condition of the antennas and discussing options for securing the 9,800-pound satellite in the payload bay for reentry on Tuesday.

*Endeavour* had been catching up to EURECA with a series of maneuvering engine burns that began shortly after Monday's 8:07 a.m. CDT launch. Grabe maneuvered the shuttle within the grasp of the robot arm with a terminal phase initiation burn about 6:27 a.m. The

Please see **SPACEHAB**, Page 4



## NASA uses new method to detect new stars, planets

NASA astronomers investigating how stars are born have used a new approach to observe the motion of multiple clumps of interstellar gas that are on the verge of becoming new stars and planetary systems.

This experiment was performed with the new instruments developed for NASA's High Resolution Microwave Survey, which is searching for radio signals that may be coming from technological civilizations on planets orbiting distant stars.

HRMS is part of NASA's Toward Other Planetary Systems program, which is designed to find and study planets forming around other stars.

The Milky Way galaxy contains large, massive interstellar clouds of gas which are the nurseries for newborn stars. Astronomers believe

gravity causes these clouds to collapse and fragment and produce smaller, dense clumps of gas. In time, these clumps collapse to form protostars and ultimately, stars and planetary systems.

"We hope that by finding and characterizing these small, dense clumps of gas we can understand the star formation process and why different types of stars evolve," said Dr. Thangasamy Velusamy, a member the research team at NASA's Jet Propulsion Laboratory.

One way to study interstellar clouds is to detect the radio emissions produced by a variety of molecules found in the gas clouds.

The JPL scientists observed that radio emissions from a carbon-sulfur chain molecule, called CCS, stand

Please see, **LACK**, Page 4



**REMEMBERING DEKE**—Colleagues and friends of astronaut Donald K. "Deke" Slayton remember his contributions to the space program and share anecdotes from his past during a memorial service held June 19 in Teague Auditorium. From left are JSC Deputy Director Paul J. Weitz, Mercury, Gemini and Apollo astronaut Wally Schirra, comedian Bill Dana, friend and fellow pilot Dusty Dowd, Mercury and Apollo astronaut Alan Shepard, Space Services Inc.'s David Hannah, Russian cosmonaut Alexei Leonov, Mercury astronaut and Sen. John Glenn, former NASA colleague Bob Thompson and NASA Administrator Daniel S. Goldin.

JSC Photo by Mark Sowa

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## Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday. For more information, call x35350 or x30990.

EAA Ringling Bros. & Barnum & Bailey Circus — July 17, 11 a.m. at the Summit: \$9. EAA River Rafting Trip — July 17: \$36 per person includes transportation, guided raft trip and barbecue dinner. On sale until July 9.

Six Flags Over Texas — Discount tickets: one-day pass, \$19.95; two-day pass, adult \$24.95 and children under four feet, \$18.95.

Splash Town USA — Discount tickets: \$10.50.

Astroworld — Discount tickets: adult, \$18.95; children under 54 inches, \$15.95.

Waterworld — Discount tickets: \$9.95.

Sea World in San Antonio — Discount tickets: adult, \$19.75; child (3-11), \$13.15.

Fiesta Texas, San Antonio — Discount tickets: adult, \$18.35; child (6-11) \$12.75.

Space Center Houston — Discount tickets: adult, \$7.50; child (3-11) \$4.50; commemorative: \$8.75.

Metro tickets — Passes, books and single tickets available.

Movie discounts — General Cinema, \$4.50; AMC Theater, \$3.75; Loews Theater, \$4.

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## Gilruth Center News

**Sign up policy** — All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a badge or EAA membership card. Classes tend to fill up four weeks in advance. For more information, call x30304.

**EAA badges** — Dependents and spouses may apply for photo identification badges from 6:30-9 p.m. Monday through Friday. Dependents must be between 16 and 23 years old.

**Defensive driving** — Course is offered from 8 a.m.-4:30 p.m. July 17. Cost is \$19.

**Weight Safety** — Required course for employees wishing to use the Gilruth weight room is offered from 8-9:30 p.m. July 1. Pre-registration is required; cost is \$5.

**Aerobics** — High/low-impact classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$32 for eight weeks.

**Exercise** — Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$24 for eight weeks.

**Aikido** — Martial arts class meets Tuesdays from 5-7:30 p.m. Cost is \$15 per month.

**Golf** — Group lessons will meet Mondays for seven weeks at the Clear Lake Golf Course through July 19. Cost is \$90. Loaner clubs are available for those who need them.

**Fitness program** — Health Related Fitness Program includes medical examination screening, 12-week individually prescribed exercise program. Call Larry Weir, x30301.

**Volleyball workshop** — A beginner's volleyball workshop will meet from 2-4:45 p.m. Saturdays for eight weeks beginning July 10. Cost is \$25.

**Intercenter Run** — T-shirts are now available for pick-up at the Gilruth.

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## Swap Shop

Swap Shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Ads may be run only once. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2. No phone or fax ads accepted.

### Property

Sale: Friendswood, Forest Bend, 3-2-2, near new school, new roof and paint, child's playhouse, lg backyard, \$72k nego. Ted, x36894 or 992-4814.

Lease: CLC, 1 BR condo, FPL, W/D, cov parking, security alarm, upstairs, Jim Briley, x44632 or 488-7901.

Sale: Dickinson waterfront, 4-2.5-2, pool, FPL, wet bar, 100 yr old trees, 3/4 acre, security sys, \$224k. x34354 or 337-1640.

Sale: Pearland Sunset Meadows, 3-2.5-2, formal, study, lg master BR, 2.5 yrs old, \$108.9k. Jim, 482-8800.

Rent: Southern Colorado, 2 BR, furn, sleeps 5, close to skiing, fishing, national forest area, no smoking, no pets, day/wk/mo or longer. Bob, x30825 or 998-7372.

Rent: Winter Park, Colorado condo, furn, sleeps 6, hiking, biking, fishing, golf, horseback, mountains, streams. 488-4453.

Sale: Meadow Bend, 3-2-2, 1480 sq ft, FPL, sundeck, new fence, garage doors, \$71.9k. Nasser, x33685 or 334-1032.

Sale: Westwood Shores, Lake Livingston, appraised \$9.5k, sell for \$4k OBO. x31834 or x30032.

Sale: Pasadena TH, lg extra nice, 3-2.5-2CP, no approval, owner, no agents, common pool, \$47k. 477-1188.

Rent/Sale: Waterfront, 1-1 condo off Egret Bay Blvd, FPL, fans, W/D, dishwasher, microwave, balcony w/2 glass doors, 2 outdoor closets, cov parking, boat ramp, dock, pool and entry gate, \$530 + dep. Karl, x33031 or 286-9822.

Rent: Galveston condo, furn, sleeps six, Seawall Blvd and 61st St, pools, cable TV, wknd/wkly/dly rates. Magdi Yassa, 333-3760 or 486-0788.

### Cars & Trucks

'78 Porsche 928, brown w/leather int, auto, ex cond, 75k mi, \$8500. Bill, x48889.

'85 Buick Park Avenue, low mi, loaded, leather int, \$4500. 532-2082.

'77 Cutlass Supreme Brougham, rebuilt trans, \$1150 nego. David, 334-6737.

'82 Honda Civic, 5 spd, A/C, 150k mi, \$1k. Craig, 333-6779 or 480-3246.

'92 Acura Integra LS, 18k mi, cruise, pwr windows and locks, rear spoiler, rosewood. 922-4014.

'78 '71 Chevy Nova, V8, orig owner, \$4500. 480-1998.

'91 Camaro RS, white, A/C, cass, \$7k OBO. x31384.

'85 Honda CRX, good cond, \$2850. Bob Bragg, x39060 or 337-2777.

'83 Chevy Citation X-11, HD V6, auto, A/C, 59k mi, ex cond, \$1995. 488-4188.

'84 Celica GT, 5 spd, new paint and tires,

cruise, tilt, alarm, ex cond, 95k mi, \$4250 nego. x30643.

'89 Honda Accord LX, burgundy, 4 dr, auto A/C, pwr, cruise, 45k mi. Ray, x38030.

'85 Jeep Laredo C5-7, 5 spd, A/C, P/S, P/B, 4WD, \$5800. x35107.

'85 Crown Victoria, loaded, 69k mi, ex cond, \$4500; '89 Chevy Chyenne PU, \$600 OBO. 334-2335.

'89 Corsica, one owner, pwr, clean, \$5500. 383-2953.

### Boats & Planes

'89 180 BR, Sea Ray V6, 175 HP, 30 hrs, ex cond, access incl, \$11.5k. Ray, x41063 or 334-4124.

'86 Bayliner Capri 15, '87 Mercury 35 ELPTO, galv trlr, garaged, \$2950 or trade. Chuck, x48354 or 480-8452.

16' G-Catamaran, good cond, trlr and access incl, \$650 OBO. x30385.

Santana 22' sailboat, fixed keel, new main, jib, spinnaker, bottom job and survey done in Feb, ex cond, \$4k. x34063 or 532-1730.

20' fishing barge, 50 HP, trlr and extras, old but runs great in bay, \$1500 or trade for running work truck, V6 eng or smaller. x37464 or 337-1470.

'81 US Yachts 22' sloop w/4.5 HP eng, hull just cleaned, ex cond, \$4k. Russ, x45979 or 554-5904.

15' fiberglass V-hull boat w/55 HP Chrysler O/B, \$650. 334-2335.

### Cycles

'88 Hurricane, 19k mi, \$2700 OBO. x34204 or 480-2954.

### Audiovisual & Computers

512k enhanced Mac w/additional external drive, ImageWriter II printer, Right Writer, Microsoft Word, Excel, etc, \$600 OBO. Elisabeth, 521-9442.

TI 99 4A computer w/acc. Fred, 944-3523.

Panasonic dot matrix 24 pin printer, 192 cps, ex cond. 286-8822.

Onkyo TX-4000 recvr, ex cond; Onkyo TA-2050 cass, not working; Pioneer cabinet, 2 JBL R-103 speakers, \$100 all. 486-0732.

Nintendo 8 bit system, joystick, game genie, 30 games, sell all or part. Frank, x39924 or 992-3515.

Simpson 260AFP-1 multimeter, overload protection, ex cond, \$50. Frank, x39924 or 992-3515.

IBM XT clone, 20 MB HD, 5.25 FD, modem, mono monitor, 101 ext kybd, new 24 pin Epson printer, software, \$600 OBO. Roman, 922-7149.

Vaxstation II, 6 MB RAM, two 80 MB HDs, TK50 tape drive, VT 240 KB, 17" mono monitor, release 4.7 MicroVMS, 9600 baud commercial line modem, LA210 dot matrix printer, spare TK50 tapes, manuals, BO. 282-5271.

Free beta machine, doesn't work. 480-2444.

RCA Camcorder and stereo. 996-9191.

Computer flight program. AsureSoft Elite Personal Flight Simulator, for IBM or Mac, simulates Cessna or Mooney, incl universal controls interface w/built-in microprocessor and navigation software for Houston, Dallas and San Francisco, \$550 all. 482-9084.

386-335X computer w/387 math coprocessor, 85 MB IDE HD, 2 MB RAM, 3.5 FD, super I/O

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## Dates & Data

### Today

**Cafeteria menu** — Special: breaded cutlet. Entrees: baked chicken, beef chop suey, smoked sausage and German potato salad, French dip sandwich. Soup: cream of broccoli. Vegetables: okra and tomatoes, peas, navy beans, baby carrots.

### Tuesday

**Work Process Identification workshop** — A Work Process Identification workshop is set for 8:15 to 11:45 a.m. June 29 in Building 1, Room 966. John H. Bitzer, Director of SR&QA at Martin Marietta Astronautics Group in Denver, Colo., will discuss weighting factors and brainstorming techniques for work process selection and how to prepare for process definition and analysis. For more information, please call Ed Pritchard at x34212.

**Cafeteria menu** — Special: fried chicken. Entrees: Salisbury steak, steamed pollock, vegetable lasagna, French dip sandwich. Soup: split pea and ham. Vegetables: mixed vegetables, French cut green beans, pinto beans, vegetable sticks.

### Wednesday

**Toastmasters meet** — The Spaceland Toastmasters Club will meet June 30 at 7 a.m. at the House of Prayer Lutheran Church on the corner of Bay Area Blvd. and Reseda Drive. Call Jim Morrison at 480-9793 for more information.

**Astronomy seminar** — The JSC Astronomy Seminar will conduct an open discussion meeting at noon

June 30 in Bldg. 31, Rm. 129. For more information, call Al Jackson at 333-7679.

**Cafeteria menu** — Special: stuffed bell pepper. Entrees: fried catfish with hush puppies, stir-fry chicken and rice, wieners and beans, Reuben sandwich. Soup: seafood gumbo. Vegetables: buttered rice, Italian green beans, corn O'Brien, peas and carrots.

### Thursday

**Cafeteria menu** — Special: barbecue smoked link. Entrees: turkey and dressing, beef stroganoff, chopped sirloin, French dip sandwich. Soup: tomato Florentine. Vegetables: Lima beans, buttered squash, Spanish rice, oriental vegetables.

### Friday

**Cafeteria menu** — Special: meat sauce and spaghetti. Entrees: rainbow trout, liver and onions, beef cannelloni, pork and shrimp egg roll, Reuben sandwich. Soup: seafood gumbo. Vegetables: steamed broccoli, breaded okra, cut corn, black-eyed peas.

### Monday

**Cafeteria menu** — Special: turkey and dressing. Entrees: breaded veal cutlet, beef chop suey, steamed pollock, beef cannelloni, French dip sandwich. Soup: beef and barley. Vegetables: Brussels sprouts, mixed vegetables, egg plant casserole, winter blend vegetables.

### July 12

**Space Society meets** — The Clear Lake Area Chapter of the

National Space Society will meet at 7 p.m. July 12 at the Freeman Memorial Library. For more information, contact Marianne Dyson at 486-4747.

### July 14

**Freedom Fighters meet** — The Space Station *Freedom* Fighters will meet at noon and 5 p.m. July 14 in Rm. 160 at the McDonnell Douglas Tower. For more information, call David Cochran at 482-7005.

### July 20

**TSP briefing** — A briefing on the Thrift Savings Plan is scheduled for 9:30 a.m. July 20 in Bldg. 45, Rm. 119. Open season for TSP runs from May 15-June 31. For more information, call the Employee Services Section at x32681.

### July 28

**Freedom Fighters meet** — The Space Station *Freedom* Fighters will meet at noon and 5 p.m. July 28 in Rm. 160 at the McDonnell Douglas Tower. For more information, call David Cochran at 482-7005.

### Aug. 1

**Call for papers** — Space 94: Engineering, Construction and Operations in Space and its co-located conference, Robotics for Challenging Environments are seeking papers for the Feb. 26-March 3 gathering. Organized by the American Society of Civil Engineers, the conference will accept abstracts of draft papers for pier review until Aug. 1. For more information, contact 1-800-SPACE94 or Stewart Johnson at 505-848-4013.

walnut goldleaf candlestick holders for wall mounting, \$35; solid maple short poster dbl sz bed frame, \$125; wall mirror, 2' h x 3' w, in ornate gold leaf frame, \$100. Gene, x30182 or 480-9580.

Contempo butcher block style dinette set, 4 chairs, ex cond, \$125; contempo mauve colored coffee and end table, ex cond, \$175 for set. x32129 or 333-5113.

Jenny Lind baby bed, mattress, new, \$50; baby highchair, new, \$15. Yvonne, x33066.

Extra heavy 48" round pine table, 12" extension w/4 captain's chairs, \$500; matching Thomasville side hutch, \$250. Eve, 488-0667.

Oblong rattan coffee table w/glass top, walnut color, was \$200, now \$40 OBO, needs glass replaced. 333-9812.

New GE elec stove/oven, built in style, \$200. Teena, x37787 or 422-6369.

4 pc set wood frame furniture, \$120; oval dining table, 3.5' x 4' w/4 solid wood chairs, \$220. 283-1239 or 538-4393.

21" Clarke floor machine, rotating scrubber, sander, polisher, hvy duty pro model, \$200. Gary, x48392 or 480-9716.

Upright freezer, \$220; refrigerator, old and working, \$35. x30686 or 480-3260.

Whirlpool gas dryer, 2 yrs old, ex cond, super capacity/hvy duty, was \$459, now \$250. 286-4648.

Dining rm set, formal table, 2 leaves, 2 arm chairs, 4 side chairs, 2 section china cabinet, ex cond, \$950. 488-8493.

Kg sz waterbed w/mirrored hdbd, drwrs, solid wood, Hiberbation motionless mattress, \$385. x35107.

### Wanted

Want used 1/2 inch plywood, any grade or finish. Ronnie, 538-1649.

Want used whitewater kayak, any condition. Ronnie, 538-1649.

Want one or two folding camp cots. 326-2307.

Want riders to join VPSI Vanpool from Meyerland Park & Ride at 7:05 a.m. to JSC, on-site personnel. 8 a.m./4:30 p.m. shift. Travis Moebes, x45765 or Don Pipkins, x35346.

Want to carpool from Kuykendall Park & Ride. Cathy, x47599.

Want to buy bicycle child trailer cart, prefer foldup type. x30074 or 470-9994.

Want CGA computer monitor. 992-5745.

Want camper shell for full sz PU. 482-2877.

Want someone in Clear Lake area to watch 4 yr old in their home, 5 days, 7:30 to 4:15 p.m. 480-3424.

Want Nikon camera equipment, AF lenses, SB flashes, filters. Joe, 282-3905 or 286-8708.

### Miscellaneous

Vanguard Palomino hardtop pop-up tent trlr, sleeps 4 to 6, kitchenette w/propane stove, dining table, 12V or 110V elec conn, ice box, \$1500 OBO; couch w/hideaway bed, ex cond, \$100 OBO; TV antenna w/25' coax cable, \$20. Ed, x41125 or 481-4889.

Pop-up camper, sleeps 6, sink, stove, heater, \$1200; kg sz waterbed, semimotionless, blk leather hdbd, \$400. x36696 or 332-9102.

Stackable washer/dryer unit, \$75 OBO; Soloflex type weight bench, \$75 OBO; professional sound system equip. Mark, x45696 or 333-0425.

Dual action flywheel exercise bike w/upper body rowing feature, ex cond, \$50. 488-3966.

Lawnmower, 18" elec, one yr old, new blade, \$100. 474-7883.

Arkla gas barbecue grill w/side burner, ex cond, \$225. 474-7883.

Sears cross country ski/rower, \$50. Pam, 538-3291.

Solid oak leather top desk, 7 drwr w/lock, 2 hand files, \$150. 282-4558.

Gilbert erector set, remote control pwr line, \$20; shopping bag each of 12 and 20 gauge plastic hulls, \$5 ea; two mayo jars of .308 cal brass, \$10; two boxes of bullets, \$5. Trebes, x37215 or 333-4374.

Two Astroworld/Waterworld individual season passes, \$60 ea. Diane, x47129.

Exercise bike, \$35. Dorothy, 482-1505.

Smith and Wesson mod 3914 mini 9mm automatic, \$350. 487-2061.

Monkey grass in 1 gal containers. x30974 or 554-7083.

21' Gulf Coast sailboat and trlr, 5 HP Honda, 4 sails, \$2900; reel-to-reel tape player, \$50; 24" elect grill, \$150; patti machine, \$800. 383-2953.

Medical type lounge chair used for dialysis treatment, E. Rubenstein, x34807 or 532-2211.

35mm Minolta camera w/35mm and 50mm lenses, \$100; Airmoterm exercise bike, \$150; self-propelled lawn mower, \$75. Shari, x36076 or 992-3517.

Pool vacuum, needs hose, \$400 OBO; 12' flat-bottomed canoe, no paddles, \$200 OBO; washing machine, not working, free you pick up; men's suits sz 38 reg, 30" waist, \$75 ea OBO; dishwasher, needs work, you pick up, \$10. Jackie, 282-4337 or David, 554-7305.

Desk, wood w/laminate top, typewriter drawer, good cond, \$75. 538-1579.

Sears gas barbecue grill, dbl burner, propane tank, serving board, utensils, \$125. x44570 or 482-6879.

French Provincial sofa, fruitwood, beige; love seat, modern, brown velour; CJ7 Bimini top CJ7; 4 Rosewood cemetery lots; Remington Rand typewriter. 282-4849 or 941-3262.

Horse manure, well composted, good fertilizer, \$5 per truck load. (409) 925-1942.

New Home sewing machine, mod SX-2122, computerized, ex cond, \$400. 333-7730.

Dishwasher; sliding glass door and frame; Rainbow vacuum; women's 12 spd bike; hedge trimmer; medical bed; baby jump-up, bouncer, walker; lawn mower. 996-9191.

Schwinn exercycle, \$75; Lawnboy mower, \$15. x30467.

Wedding gown w/pearls, sequins, V-neck, chapel length train, sz 6-8, veil and petticoat, \$400. x36696 or 332-9102.

Left-handed Puma gold clubs, \$350; Maxima 300 Stairmaster, \$250; solid oak dining rm set for square area w/benches, was \$1200, now \$600. x44698.

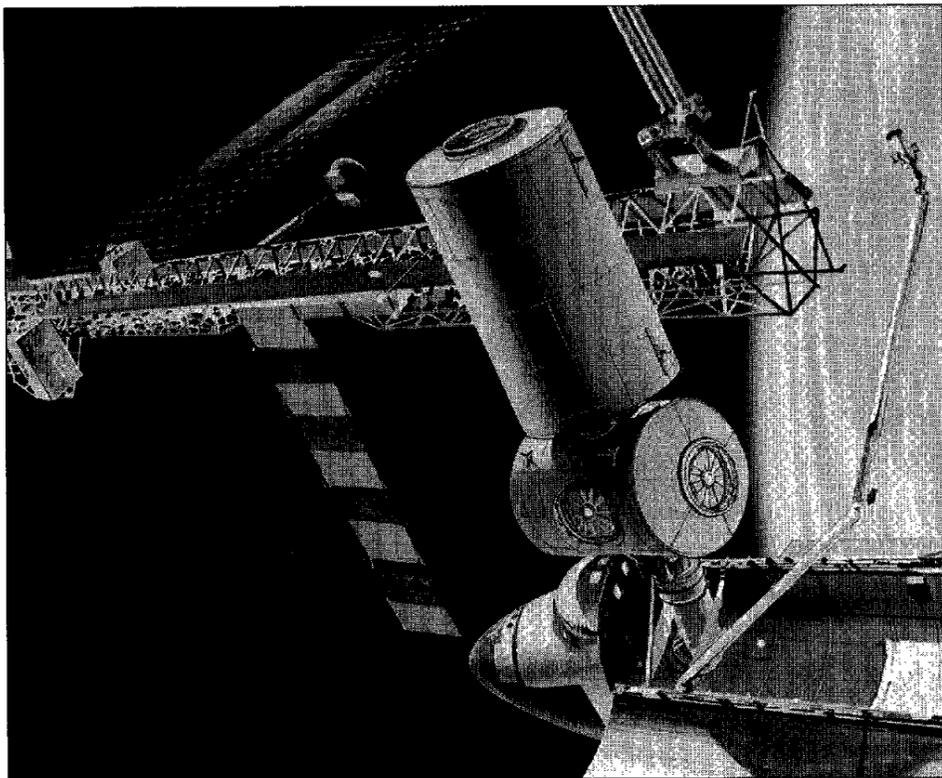
58 gal Oceanic aquarium, 36" x 18" x 20.5", 36" wood stand, dual fluorescent bulb light fixture, \$110. Rod, x31465 or 991-3965.

Bank quality, newly refinished walnut desk, matching upright computer storage unit, \$995. Dale, x48179 or 481-0046.

Royal manual typewriter, \$50 OBO. 482-2877.

Office desk, 60" by 30", 5 drwrs, chair, \$85. 333-6225 or 480-2973.

# From the Drawing Boards



## Option A

Provides a modular build-up design that offers a lower cost approach to Space Station Freedom while keeping a strong focus on user needs and international agreements. Option A1 — Modular build-up using Lockheed-built "Bus-1" spacecraft to provide guidance, navigation, control and propulsion. Option A2 — Modular build-up without the "Bus-1."

**Key Design Drivers** — Use current and simplified Space Station Freedom systems where cost-effective and repackage, reduce and simplify elements to reduce overall costs, number of assembly flights and extravehicular activity.

**Overall Dimensions at PHC** — A1, 245 feet end-to-end; A2, 281 feet end-to-end.

**Shuttle flights** — 16 assembly flights to PHC, five utilization/logistics flights per year

### Four phase buildup

— **Power station** (First element launch October 1997) Achieved with three flights; one photovoltaic array provides 23 kilowatts of power; provides three attachment sites for external payloads; orbiter with Spacelab docks to power station for human tended research of up to 20 days.

— **Human Tended Capability** (April 1998) Achieved with four flights; adds a common core/lab module which houses laboratory

equipment, nine international standard racks, subsystems and integrated berthing ports for international partner elements and logistics module; adds Canadian space station remote manipulator system; orbiter docks to station for human tended research of up to 20 days.

— **International Human Tended Capability** (December 1999) Achieved with 12 flights; adds Japanese Experiment Module/Exposed Facility and ESA's Columbus Attached Pressurized Module; adds cupola; adds second PV array for total of 46 kilowatts of power; orbiter docks to station for human-tended research of up to 20 days.

— **Permanent Human Capability** (September 2000) Achieved with 16 flights; adds habitation module; adds third PV array for total of 57 kilowatts of power; uses two Soyuz TM spacecraft for assured crew return; adds airlock for station-supported extravehicular activities. □

## Option B

Derived from mature Space Station Freedom designs, makes maximum use of current systems and hardware to provide an incrementally increasing capability, emphasizing accommodations for users, adherence to international partner commitments, flexibility and growth potential.

**Key Design Drivers** — Option B configuration and assembly were guided by the orbital inclination, accommodation of international partner elements, an assured crew return vehicle, the space shuttle as a launch vehicle and a permanent human presence in space. Other design factors included accommodation of microgravity and life sciences (including a 2.5 meter centrifuge), support to a four-person crew for 10 years and two-fault tolerance for crew and station survival.

**Overall dimension at PHC** — 331 feet end-to-end

**Shuttle flights** — 20 assembly flights to PHC; 12 utilization/logistics flights

### Four-Phase Buildup

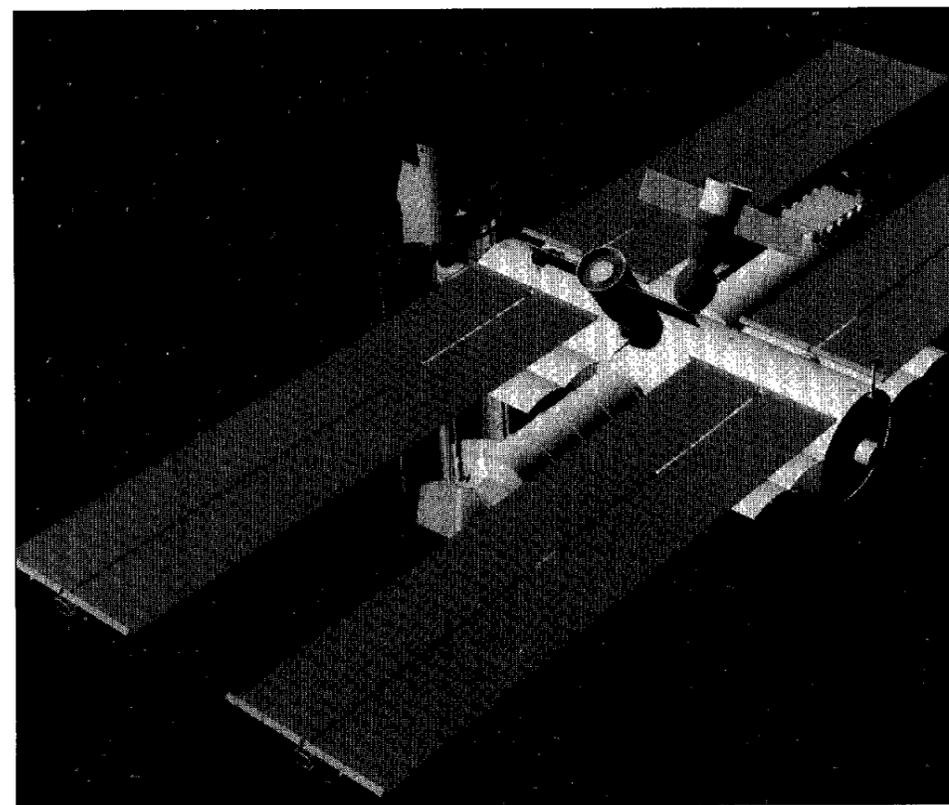
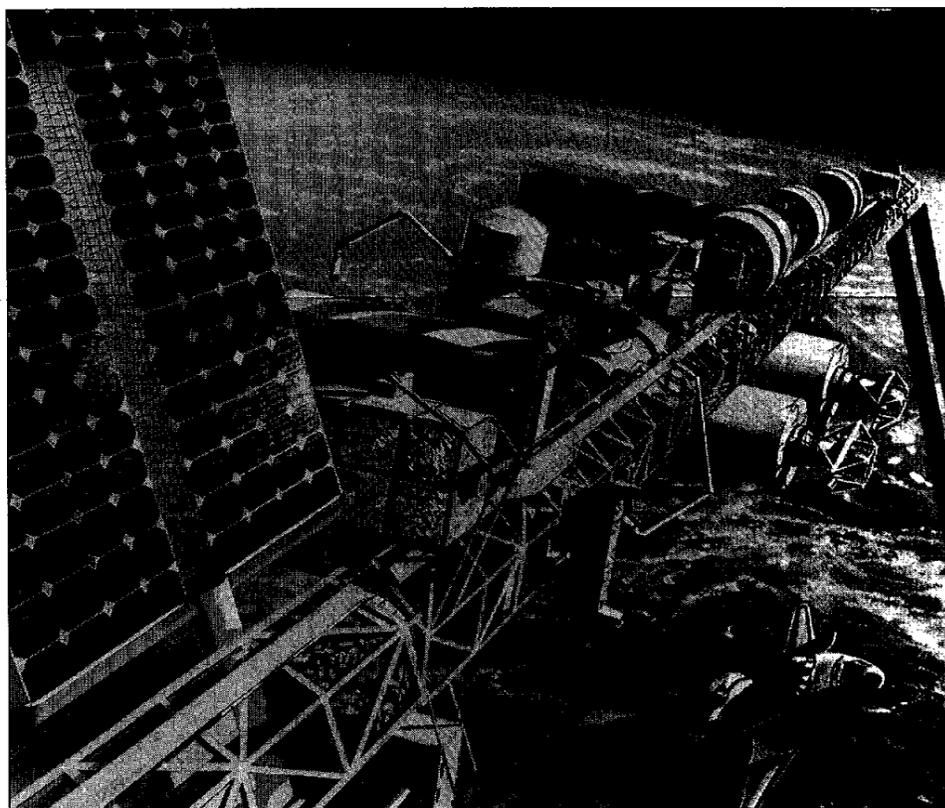
— **Power Station** (First Element Launch — October 1997) — Achieved with two flights; major subsystems include active thermal control, S-band communications, propulsion and control moment gyroscopes; one photovoltaic array provides 23 kilowatts of power; one external payload attachment point; orbiter with Spacelab docks to power station for human-tended research of up to 20 days.

— **Human Tended Capability** (December 1998) — Achieved with eight flights, Adds the

U.S. laboratory module which houses laboratory equipment, subsystems, a node and an airlock, 13 international standard payload racks and three non-standard payload rack locations; two external payload attachment points; one PV array provides 8.5 kilowatts to users; 50 Mbps downlink and 72 kbps uplink data streams; operates with and without an orbiter docked; orbiter with Spacelab docks to power station for human-tended research of up to 20 days.

— **International Human Tended Capability** (March 2001) — Achieved with 17 flights; adds portside truss; adds Japanese Experiment Module/Exposed Facility and Columbus Attached Pressurized Module (total payload volume increased to 48.5 rack sites); adds Canadian Space Station Remote Manipulator System; adds cupola; adds second and third PV array for total of 68 kilowatts of power; orbiter docks to station for human-tended research of up to 20 days.

— **Permanent Human Capability** (December 2001) — Achieved with 20 flights, adds habitation module, adds second node; adds three additional external attached payload sites covering ram, wake, zenith and nadir viewing; uses two Soyuz TM spacecraft for assured crew return. □



## Option C

Uses a shuttle-derived launch vehicle to place a space station into orbit with a single launch, retaining as much commonality as possible with existing space shuttle systems and moving as much equipment as possible inside the large core module to cut down on extravehicular activity.

**Key Design Driver:** Use shuttle hardware and software for all aspects of ascent flight control and retains all features of the shuttle main propulsion system. Minimizes impact to KSC launch facilities and takes advantage of shuttle hardware components to provide common logistics support for shuttle and station, and maximizes use of current shuttle ground infrastructure.

**Core module dimensions** — 92 feet long.

**Shuttle flights** — 10 assembly flights to PHC; two utilization/logistics flight.

### Single Launch Core Station Module

(Launch September 1999) — Orbiter aft fuselage and aerodynamic fairings attached to 92-foot long common module and attached to standard space shuttle external tank and solid rocket boosters; on-orbit pressurized module is 64 feet long and 22 feet in diameter with 10-foot long unpressurized equipment bays on each end; two fixed PV arrays which can provided from 34.2 kW to 57.6 kW power depending on flight mode; body mounted

and deployed radiators; Canadian Space Station Remote Manipulator System; docking ports on both ends for shuttle or Soyuz; seven berthing ports, two for Soyuz ACRV and five for international partner modules and logistics module; six optical windows; 26,000 cubic feet of volume divided into seven decks; accommodates 40 payload racks; 50 Mbps downlink and 72 and 128 uplink data streams.

— **Permanent Human Capability** (November 1999) — Achieved with three flights, includes two Soyuz TM spacecraft for assured crew return; Canadian Special Purpose Dexterous Manipulator.

— **International Permanent Human Presence** (July 2000) — Achieved with nine flights; adds and fully outfits Japanese Experiment Module/Exposed Facility and Columbus Attached Pressurized Module; adds user racks.

— **Permanent Human Capability** (January 2001) — Achieved with 10 flights; adds third PV array for total of 76 kilowatts of power. □

# SHARP students spend summer learning at JSC

Fifteen students from 11 area high schools are participating in an eight-week intensive science and engineering program at JSC to give them first-hand experience and insight into careers with NASA.

The 1993 Summer High School Apprenticeship and Research Program is a feeder program that builds a resource pool of potential applicants for future NASA employment in science and engineering. The program is specifically designed for students who have demonstrated an aptitude for and interest in science or engineering.

Twenty-four former SHARP students are currently summer interns at JSC in the Junior Fellowship Co-op Program, the Pre-Coop Program, the NASA Scholars Program or the Undergraduate Student

Researchers Program.

The SHARP program is a union of education and business designed to provide the motivation and experience that will get high school students interested in continuing their education in science and engineering. The program gives students hands-on opportunities to enhance their college education and help them envision themselves in science and engineering careers.

For consideration in the program students must be 16 years old, live within commuting distance from a NASA center, be U.S. citizens enrolled in high school, and must have completed the 10th grade. Required courses include algebra, geometry and at least one year of biology, chemistry or physics with a grade of B or better.

At JSC, participating students include Christina Allen from LaMarque High School working with Carolyn Clark in Life Support Systems; Jaime Alvarado from Sterling Aviation High School assisting Charles Got in Automation and Robotics; David Anderson from Mount Carmel High School learning with William Palosk in Biomedical Research; Beryl Barnes from LaPorte High School apprenticing with Sarah Kirby in Space Station Systems; Tainisha Butler from the High School for the Engineering Professions interning with Chris Culbert in Software Technology; Khalilah Campbell from the High School for the Engineering Professions working with Louis McFadin in Automation and Robotics; Juan Cervantez from Alvin

High School assisting Joe Olivarez in Quality Technology; Allison Grant from the High Schools for the Engineering Professions at Booker T. Washington teamed with Greg Oliver in Ascent/Entry Shuttle Flight Dynamics; Quincy Harp from Clear Creek High School apprenticing with Joe Olivarez in Quality Technology; Joseph Le from Nimitz High School learning from Mike Johnson in Life Support Systems; Israel Silva from Milby High School assisting Steve Gonda in Biomedical Research Lab; DeMarr Thomas from Sterling Aviation High School working with Joe Olivarez in Quality Technology; Charlie Whittaker from Jones Vanguard High School apprenticing with Chris Culbert in Software Technology; and Brian Williams from Clear Brook High School

assisting Tivo Perez in Shuttle Training Aircraft Simulation.

The 1993 SHARP class was matched with JSC mentors based on their science interests and skill level. Susan Anderson from AH3 is the JSC program manager, and Howard Bruce, a Houston Independent School District high school counselor, serves as faculty coordinator. SHARP is sponsored by NASA's Educational Affairs Division and participating NASA centers. The Quality Education for Minorities network, a non-profit organization dedicated to improving the education of minorities throughout the nation, serves as NASA's facilitator for this new education program.

For more information call Howard Bruce or Susan Anderson 483-3076.

## Goldin applauds redesign team's station efforts

(Continued from Page 1)

and major management changes to cut costs, reduce bureaucracy and improve efficiency," the President said. "We are going to redesign NASA as we redesign the space station."

Vice President Al Gore and his National Performance Review team will work with NASA to develop the proposed management changes.

"We at NASA are gratified by the faith the President has placed in us to accomplish this challenging task, and inspired by his vision for our country's future in space," Administrator Daniel S. Goldin said.

Goldin said people from every part of the agency worked long hours and at great personal sacrifice to prepare the three options for presidential review.

"I want all Americans to be aware of the extraordinary effort put in by all of NASA's employees," Goldin said. "I could not be prouder of any group of individuals than I am of the NASA team; our country is well served by these men and women."

NASA remains committed to ensuring America's competitiveness in science and technology now and into the 21st Century, Goldin said, and the space station will be a knowledge engine on the high frontier, returning dividends to Americans for years to come.

"But there are larger issues at stake, and we are pleased that the debate over this program is beginning to encompass the landscape we know as the future. In the wake of the Cold War, it is important for this nation to achieve a consensus on future goals for the space program. It is important for us to ask ourselves what kind of a space program we want, what kinds of goals we should pursue, and what kind of legacy we want to hand down to our children," Goldin said.

With the President's leadership and support, Goldin said, NASA has an opportunity to help define a new era of international peace and cooperation through our scientific partnerships in space.

Goldin added that NASA must rededicate itself to continuing the internal improvements that have begun to fundamentally change the agency for the better.



JSC Photo

**Bernard Rosenbaum, left, and Phillip Cota, both Engineering Directorate employees, recently became the first JSC workers to earn the NASA Flight Safety Award. They were part of a team that included Rockwell employees Steve Coester, Larry Miller, Mark Peller and Jay Yoshinago.**

## JSC team brings home NASA Flight Safety Award

A team of JSC and Rockwell engineers recently became the first at JSC to be awarded the NASA Flight Safety Award.

Engineering Directorate civil servants Bernard Rosenbaum and Phillip Cota, and Rockwell employees Steve Coester, Larry Miller, Mark Peller, and Jay Yoshinago received the award in a ceremony at Kennedy Space Center.

During the STS-47 pre-launch mating of the orbiter and external tank oxygen umbilical, the JSC-Rockwell team determined that the mate was faulty and insisted that a conservative leak test be done to verify their concerns about the flight-worthiness of the joint. Tests confirmed that the connection was inadequate, and this led to the removal, repair and retesting of that joint for flight.

The award was presented by NASA Associate Administrator for Safety and Mission Quality Fred Gregory. Cota was unable to be present at the ceremony at KSC,

but later received his award at JSC from the chairman of NASA's Flight Safety Panel, astronaut Dick Richards.

"To understand the critical value of what they did, consider that hardware failure at that one interface during or after launch could have resulted in catastrophic consequences for the crew and the shuttle," Gregory said. "This team chose to stand firm on what they knew and believed to be right, and in the process may have saved lives. This is teamwork at its finest."

The NASA Flight Safety Award was created to recognize extraordinary contributions to space flight safety that help avoid catastrophic mishaps to the vehicle, crew, or mission. Administered NASA-wide through the Manned Flight Awareness Program, the intent is to impress the importance of crew safety on the minds of everyone involved with America's manned space flight program.

## Personal identification numbers to change

Just when you thought you finally had your personal identification number memorized, it's time to change it again.

JSC's Security Office reports that, effective July 11, new personal identification numbers will be required for access to all of the controlled access areas at JSC. Everyone who has a permanent, temporary or escort-required CAA badge may obtain their new PIN in advance at either the Bldg. 30 badging office or the security post in Bldg. 5.

The change is needed so that the Security Office can upgrade and increase the capacity of its badging system, and so that it can purge numbers from cards that were not returned by departing employees, said Security Specialist Patti Hunter.

The upgraded system will give security the ability to issue twice as many CAA cards as before. Prior to

the change, the old system's capacity of 8,000 PINs was nearly used up. The new system, which can handle up to 16,000 PINs, will allow for expansion required by the addition of Bldgs. 5S, 30S and 46.

The PINs used for access to Bldg. 46 will not change immediately, because that building currently uses its own, separate controlled access system. Once the system in use by the rest of the center is upgraded, Bldg. 46 personnel will migrate to the new system, Hunter said.

Another reminder from the Security Office is that PINs should be memorized, not recorded.

JSC employees with CAA access who transfer to another NASA center must have the encoded access number removed from their badge at the Bldg. 30 Badging Office before departing JSC. The access number encoded at JSC cannot be used at other centers.

## Project IQ candidates selected

Seven applicants have been selected for the Fall 1993 Project Increased Qualification Program.

The Project IQ program enables participants to use up to eight hours of administrative leave each week to attend college classes that will count toward undergraduate degrees. All expenses, including tuition and text-

books, are paid by NASA.

This year's IQ participants are Yvonne Ware of Human Resources, Honey Aven and Mary Kirby of Administration, Regina Bailey and Elizabeth Hasson of Mission Operations, Juan Gamez of Center Operations and Andrea Julian of the Space Shuttle Program Office.

## Spacehab gets first workout

(Continued from Page 1)

maneuver was followed by several midcourse correction burns as *Endeavour* inched toward EURECA, and Grabe took manual control for the final phase of the rendezvous.

The day before grapple, Low and Mission Specialist Jeff Wisoff checked out the space suits they were to wear for a Friday space walk to test procedures that may be used during the Hubble Space Telescope repair mission later this year.

Following the smooth ascent, Low and Mission Specialist Janice Voss activated the Spacehab module and will begin work with some of the 13 commercial materials processing and biotechnology experiments being conducted on the first flight of the middeck augmentation module.

Experiments also include life sciences studies and a look at key components for a space station water reclamation system.

Five of the investigations involving biotechnology and human factors, including the first on-orbit growth of cells in a rotating wall bioreactor, were sponsored by JSC.

In between the engine burns needed to rendezvous *Endeavour* with EURECA, Grabe also flipped the shuttle end over end for a test run with the Superfluid Helium On-Orbit Transfer experiment. The somersaults were designed to slosh the helium in the SHOOT tanks so engineers on the ground could study techniques for refilling satellite-mounted telescopes with liquid helium coolant.

## Lack of motion may signal star formation

(Continued from Page 1)

out much more clearly in some of these gas clumps.

"We found that these parcels of gas have very little or no internal motion, other than random motions of individual molecules at very low temperatures. For this reason we believe that we are seeing the basic cloud fragments from which stars may form," said Dr. William Langer, leader of JPL's Radio Astronomy Group.

To detect the radio waves in the star-forming clouds, scientists used the large 230-foot radio telescope

at NASA's Deep Space Network in Goldstone, Calif., in conjunction with the 2 million channel wide-band spectrum analyzer that is the heart of the HRMS sky survey system.

"What made our observations unique was that we were able to take advantage of the HRMS spectrum analyzer to separate out the motions of individual clumps of gas, which gave us unprecedented velocity resolution," said Langer.

"Using this instrument with the large radio telescope allows us to detect small-scale structure in a

star-forming region and study their motions with respect to one another. This is especially important to resolve the questions of how stars form and why some stars form alone, while others form companion systems orbiting one another," Langer continued.

In collaboration with Langer and Velusamy, Drs. Thomas Kuiper, Steven Levin and Edward Olsen presented their findings before the 182nd national meeting of the American Astronomical Society at the University of California at Berkeley.

## Space News Roundup

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Dates and Data submissions are due Wednesdays, eight working days before the desired date of publication.

Editor ..... Kelly Humphries  
Associate Editor ..... Kari Fluegel

## Correction

A story in the June 21 Space News Roundup inadvertently omitted the names of three patent holders honored at this year's JSC Inventors Luncheon.

Gerald R. Taylor was recognized for his Portable Dynamic Fundus Instrument.

Steven L. Koontz was honored for inventing a Microporous Structure with Layered Interstitial Surface Treatment, and Method and Apparatus for Preparation Thereof.

Angelene M. Lee was honored for developing a Sharps Container.

A total of 16 patent holders from JSC were honored at the Gilruth Center luncheon.